REMARKS

In view of the following remarks, Applicants respectfully request reconsideration and reexamination of the present application. Claims 12-20 and 24-38 are pending.

Applicants wish to thank Examiner Talbot for the courtesy of the telephonic interview on October 19, 2004. The motivation to combine the cited references was discussed, although no agreement was reached with respect to any particular claims.

Claim Rejections- 35 USC § 103

Legal Doctrine

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). In addition, there must be a teaching or suggestion to make the claimed combination and a reasonable expectation of success that are found in the prior art, and not in the applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). There are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art. *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457-58 (Fed.Cir. 1998) and MPEP 2143.01. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990).

The Rejection in view of Matsuda et al. and Oshima et al.

The Examiner has maintained the rejection of Claims 12-15, 17-20, 25-29, 37 and 38 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,644,193 by Matsuda et al. in combination with U.S. Patent No. 5,932,139 by Oshima et al. Applicants respectfully traverse this rejection.

According to the Examiner, Matsuda et al. teaches a phosphor coating for cathode ray tubes, fluorescent lamps and radiation screens. The phosphor coating suspension includes spherical particles having an average size of from 0.5 to 20 μm. The phosphor particles can be oxides or sulfides of phosphor and the coating can be applied by syringe

injection. The Examiner admits that Matsuda et al. fail to teach that the phosphor particles are hollow or that the coating can be applied by ink-jet in an x-y fashion.

However, the Examiner states that Oshima et al. teach hollow phosphor particles applied by ink-jet printing. Therefore, the Examiner concludes that it would have been within the skill of one practicing in the art to have modified the Matsuda et al. process by forming the phosphor coating with hollow particles and applying the coating by ink-jet, as evidenced by Oshima et al., because of the expectation of achieving similar results. While the Examiner acknowledges the fact that Matsuda et al. in combination with Oshima et al. fail to specifically teach the syringe or ink-jet coating being controllable in an x-y grid, it is the Examiner's position that this would have been an inherent function of the ink-jet printing and an automated syringe. It is further noted by the Examiner that these *are the same* coating techniques and hence the Examiner can draw no other conclusion as to this limitation. If Applicants disagree, the Examiner invites Applicants to supply a showing or reasoning why the claimed ink-jet and syringe are x-y controllable and that the prior art's same devices are not.

Matsuda et al.

Matsuda et al. is directed to spherical phosphor particles useful for cathode ray tubes, x-ray image intensifiers, fluorescent lamps and radiation intensifying screens. The particles are formed by supplying conventionally prepared phosphor powders to a high-temperature thermal plasma, where the conventionally prepared phosphor powders have an increased dopant concentration (Col. 9, lines 23-44).

For the manufacture of a cathode ray tube (e.g., for a projection television) having a phosphor screen (see reference numeral 2 in Fig. 1), the detailed description of Matsuda et al. illustrates the fabrication technique beginning at Col. 10, line 54 through Col. 11, line 52. This section does not disclose or suggest any methodology for deposition of the phosphor layer. However, Example 4 and Example 5 illustrate that it is preferred to utilize a settling method. (See, Col. 17, lines 24-26 and Col. 18, lines 7-90).

Likewise, for an x-ray image intensifier, as illustrated in Figure 2 of Matsuda et al., the detailed description at Col. 11, line 53 through Col. 12, line 33 does not disclose or suggest any method for depositing the phosphor particles. Example 15 illustrates that a preferred method is forming a slurry of the particles and depositing the slurry using a doctor blade. (See Col. 24, lines 22-24).

The manufacture of a fluorescent lamp is described at Col. 12, line 34 through Col. 14, line 12, and is illustrated in Figure 3 of Matsuda et al. Referring to Figure 3, the phosphor layer 22 is formed *on the inner surface of a glass tube 21.* It is disclosed at Col. 13, lines 32-38, that the fluorescent lamp has a tube diameter of 8 millimeters or less. It is also disclosed that the phosphor coating can be formed by "syringe injection" or "the sucking method under reduced pressure".

Matsuda et al. also discloses the use of phosphors in a radiation intensifying screen, as is described beginning at Col. 14, line 13 through Col. 15, line 8, and is illustrated in Figure 5. It is disclosed that the phosphor layer for this device is formed by a settling method. (See, Col. 14, lines 3-59).

Thus, the extent of the disclosure of Matsuda et al., as relied upon by the Examiner, is that *a syringe injection method can be used for the manufacture of fluorescent tubes having a small diameter.* Matsuda et al. discloses in the background section at Col. 3, lines 49-56, that the diameter of these fluorescent tubes is much smaller than that of a conventional lamp and therefore the syringe injection method (or the sucking method under reduced pressure) is preferred rather than the slurry flow method that is typically employed for a conventional fluorescent lamp.

The syringe injection method of Matsuda et al. for fabricating fluorescent lamp tubes does not and can not utilize a syringe that is controllable over an x-y grid during manufacture of the lamp tube. The syringe is carefully placed into the narrow (< 8 mm) lumen of the fluorescent tube and the phosphor particles are injected into the tube. It is known that the method by which fluorescent lamp glass tubes are coated with phosphor powders is by a slurry coating method or a spraying process. The miniaturization of the spray process for narrow diameter glass tubes is the process that is referred to by Matsuda et al. as the "syringe injection method". There is clearly no intent to move the position of the syringe in the x-y direction, since this would break the glass tube that is being coated.

Oshima et al.

Oshima et al. is directed to a fluorescent substance that can be deposited using an ink-jet printer. The particulate fluorescent substance according to Oshima et al. can be fabricated by calcination. See, for example, Col. 11, lines 41-53. Oshima et al. does not disclose or suggest hollow particles, as is asserted by the Examiner. If the Examiner maintains this position, Applicant respectfully request that the Examiner point out with particularity where in Oshima et al. hollow particles are disclosed or suggested.

The Examiner's conclusion is that it would have been obvious to modify the Matsuda et al. process by forming the phosphor coating with hollow particles and applying the coating by ink-jet, as evidenced by Oshima et al.

However, the prior art does not suggest the desirability of this combination. As is discussed above, it would be counterintuitive to use an ink-jet device in the Matsuda et al. process to fabricate a fluorescent tube, since an ink-jet device would not be useful for coating the interior surface of a fluorescent tube having a very small diameter. Applicants also submit, as is discussed above, that the feature that the device is controllable in an x-y grid is not an inherent function of the automated syringe disclosed by Matsuda et al. The Examiner also concludes that "these are the same coating techniques and hence the Examiner can draw no other conclusion." However, as is specified above, these are *not* the same coating techniques and in fact are radically different applications. In those applications where an ink-jet device *might* be useful for producing the device (e.g., a phosphor screen), Matsuda et al. disclose utilizing a settling method or a doctor blade method.

In view of the foregoing, Applicants respectfully request reconsideration and reexamination of Claims 12-15, 17-20, 25-29, 37 and 38.

The Examiner has also rejected Claims 16, 24 and 30-36 under 35 U.S.C. 103(a) as being unpatentable over Matsuda et al. in combination with Oshima et al. further in view of U.S. Patent No. 5,662,831 by Chadha.

The Examiner admits that Matsuda et al. in combination with Oshima et al. fails to teach the coating being performed on a flat panel display. The Examiner states that Chadha teaches luminescent phosphor coatings on articles such as field emission displays and plasma displays and articles relating thereto. Particle sizes of less than 3 μm and a liquid medium including water, alcohols, etc. are taught. Therefore, the Examiner concludes that it would have been obvious at the time the invention was made for one skilled in the art to have had a reasonable expectation of achieving similar success for performing the phosphor coating process of Matsuda et al. in combination with Oshima et al., on a FED or PDP, as evidenced by Chadha.

However, as is discussed above, the coating process of Matsuda et al. relied upon by the Examiner to reject the claims is a coating process for coating the interior of a very small diameter fluorescent tube. Matsuda et al. discloses that when a screen is coated with a phosphor layer, that the method should be selected from a settling method or a doctor blade method.

In view of the foregoing, Applicants respectfully request removal of this rejection with respect to Claims 16, 24 and 34-36.

Applicants do not believe that any fees in addition to the extension fee are due with relation to the filing of this Response. However, if any fees are deemed necessary, please debit those fees from Deposit Account No. 50-1419.

Applicants believe that all pending claims are in condition for allowance and such disposition is respectfully requested. In the event that a telephone conversation would further prosecute and or expedite allowance, the Examiner is invited to contact the undersigned.

Respectfully submitted,

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